

CLAIMS

1. A composition comprising
- a) an acid copolymer of the composition E/X/Y wherein E is ethylene, X is an α,β ethylenically unsaturated carboxylic acid, and Y is a C₁₋₈ alkyl acylate or alkyl methacrylate, X is present in 4-35 wt.% of the acid copolymer, and Y is present in 0-50 wt.% of the acid copolymer;
 - b) about 10 to about 45 wt.% of a high molecular weight, monomeric organic acid or salt thereof based on total weight of components a), b), and c) provided that component (b) does not exceed 50 wt.% of (a) plus (b);
 - c) about 1 to about 30 wt.% thermoplastic elastomer selected from copolyetheramides, copolyetheresters, elastomeric polyolefins, block polystyrene polydiene copolymers, and thermoplastic polyurethanes;
 - d) a cation source present at a level sufficient to neutralize 80 to 110% of the combined acid content of components a) and b); and
 - e) zero to about 60 wt.% filler based on weight of components a) plus b) plus c) plus e).
2. The composition of claim 1 wherein the cation (d) is present at a level sufficient to neutralize 80 to 110% of the combined acid content.
3. The composition of claim 2 wherein the cation (d) is present at a level sufficient to neutralize 95 to 110% of the combined acid content.
4. The composition of claim 1 - 3 wherein the α,β ethylenically unsaturated carboxylic acid is acrylic acid or methacrylic acid.
5. The composition of claim 4 wherein the cation source is a source of cations selected from the group consisting of sodium, zinc, magnesium, lithium, potassium, calcium, and barium.
6. The composition of claim 1 - 3 wherein component a) is an E/X/Y copolymer wherein X is present in 6-35 wt.% of the acid copolymer, and Y is present in 5-25 wt.% of the acid copolymer.

7. The composition of claim 6 wherein component a) is an E/X/Y copolymer wherein X is present in 8-20 wt.% of the acid copolymer, and Y is present in 11-23 wt.% of the acid copolymer.
8. The center, core, or mantle of a golf ball or one-piece golf ball comprising the composition of
 - a) an acid copolymer of the composition E/X/Y wherein E is ethylene, X is an α,β ethylenically unsaturated carboxylic acid, and Y is a C_{1-8} alkyl acrylate or alkyl methacrylate, X is present in 4-35 wt.% of the acid copolymer, and Y is present in 0-50 wt.% of the acid copolymer;
 - b) about 10 to about 45 wt.% of a high molecular weight, monomeric organic acid or salt thereof based on total weight of components a), b), and c) provided that component (b) does not exceed 50 wt.% of (a) plus (b);
 - c) about 1 to about 30 wt.% thermoplastic elastomer selected from copolyetheramides, copolyetheresters, elastomeric polyolefins, block polystyrene polydiene copolymers, and thermoplastic polyurethanes;
 - d) a cation source present at a level sufficient to neutralize 50 to 110% of the combined acid content of components a) and b); and
 - e) zero to about 60 wt.% filler based on weight of components a) plus b) plus c) plus e).
9. The center, core, or mantle of a golf ball or one-piece golf ball of claim 8 wherein d) cation source is present at a level sufficient to neutralize 95 to 110% of the combined acid content of components a) and b).
10. The center, core, or mantle of a golf ball or one-piece golf ball of claim 8 or 9 wherein e) filler is present in a type and amount sufficient to achieve a density between the density of the composition without filler and 1.8 grams per cubic centimeter.

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11. The one-piece golf ball of claim 10 wherein the filler is present in a sufficient amount to adjust the density of the composition to a level that results in a golf ball that weighs about 45.93 grams.

12. The one-piece golf ball of claim 11 wherein (a) the thermoplastic polymer is a polyetherester having a shore D hardness of about 30 - 40, (b) the salt of organic acid is a magnesium salt of a fatty acid, (c) filler is ZnO, and (d) the ionomer is an ethylene/(meth)acrylic/n-butyl acrylate highly neutralized with Mg cations.

13. A two-piece golf ball comprised of a core of claim 10 and a cover wherein the filler is sufficient to adjust the density of the core to about 1.18 gm/cc.

14. The two-piece golf ball of claim 13 wherein the core comprises (a) a partially neutralized ethylene/alkyl (meth)acrylate/(meth)acrylic acid copolymer, (b) salt of the organic acid that is a salt of stearic or oleic acid; (c) thermoplastic elastomer polymer that is a polyetherester having a shore D hardness of about 30 - 40, (d) sufficient cation source to neutralize 50 - 110 percent of the cumulative acid in (a) and (b), and (e) filler that is selected from ZnO and BaSO₄.

15. The two-piece golf ball of claim 14 wherein the salt of stearic acid is a magnesium salt, the ionomer is an ethylene/(meth)acrylic acid/n-butyl acrylate highly neutralized with Mg cations to form the ionomer, and the filler is ZnO.

16. The two-piece golf ball of claim 13 wherein the core has a dimple pattern such that when positioned in the ball and covered by the cover having a dimple pattern, the cover thickness in the dimple areas is the about the same as the dimple thickness in the non-dimpled areas.

17. A three piece golf ball comprised of a center of claim 10, an elastomeric winding and a cover.

18. The three-piece golf ball of claim 17 wherein (a) ionomer is an ethylene/acrylate ester/acrylic acid copolymer highly neutralized with Mg cation, (b) metal salt of the organic acid is a magnesium salt of stearic acid, (c) thermoplastic elastomer is a copolyetherester having a shore D hardness of 30 - 40, and (e) filler is ZnO.

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19. A multi-layer golf ball having a core and a cover with one or more intermediate layers or mantles between the core and the cover, the core and the mantles being independently or both selected from the cores and mantles of claim 10 wherein the filler is sufficient to adjust the density of the core or mantle or both in which the composition is used to a level such that the golf ball has a density of 1.14 gms/cc.

20. The multi-layer golf ball of claim 19 wherein the mantle(s) and the core independently or both comprise (a) an acid copolymer selected from ethylene acrylic acid and ethylene methacrylic acid, about 5 to about 30 wt.% (b) based on weight of (a), (b) and (c), about 1 to about 35 wt.% (c) based on weight of (a), (b) and (c), and up to 60 parts (c) per hundred parts of (a) through (d) by weight.

21. A process for making the thermoplastic elastomer composition of Claim 1 comprising the steps of

- 15 (a) melt-blending an ethylene α,β ethylenically unsaturated carboxylic acid copolymer or a melt-processable ionomer thereof with an organic acid or a salt of organic acid, and
- 20 (b) concurrently or subsequently to step (a) adding sufficient cation source to neutralize at least 80% of all the acid moieties, and
- 25 (c) further melt-blending in a thermoplastic polymer component selected from group consisting of copolyetheresters, copolyetheramides, elastomeric polyolefins, styrene diene block copolymers and thermoplastic polyurethanes.

22. The process of claim 21 further comprising blending in a filler.

23. The process of claim 21 wherein the thermoplastic polymer component is added after neutralization to at least 80%.

30 2.12 24 26. The process of claim 22 wherein the filler is not reactive with acid moieties.

25 27. The process of claim 22 wherein the filler is added after neutralization to at least 80%.